WHAT IS CLAIMED IS:

1. A method including:

detecting an episode of atrial fibrillation in an atrium;

sensing ventricular depolarizations;

measuring a duration of a present RR interval since a most recent ventricular depolarization;

delivering an atrial defibrillation shock synchronized to a ventricular depolarization, which concludes a present RR interval, if the present RR interval is shockable, where a shockable present RR interval requires that a ventricular sensing refractory period of the present RR interval is less than or equal to a first predetermined value.

2. The method of claim **1**, in which the first predetermined value provides different values if the present RR interval is initiated by a sensed ventricular depolarization than if the present RR interval is initiated by a paced ventricular depolarization.

3. The method of claim **1**, in which the shockable present RR interval also requires that the present RR interval is not both initiated by a paced ventricular depolarization and concluded by a sensed ventricular depolarization.

4. The method of claim **1**, in which the shockable present RR interval also requires at least one of:

(A) the present RR interval duration is longer than a preceding QT interval duration by a second predetermined value;

(B) the present RR interval duration is longer than the preceding QT interval by the second predetermined value, and the present RR interval duration is longer than a third predetermined value;

(c) the present RR interval duration is longer than a fourth predetermined

value, in which the fourth predetermined value is greater than the third predetermined value;

(D) the present RR interval duration is longer than a preceding RR interval by a fifth predetermined value, and the present RR interval duration is longer than a sixth predetermined value; and

(E) the present RR interval duration is longer than a seventh predetermined value, in which the seventh predetermined value is greater than the sixth predetermined value.

5. The method of claim **4**, in which the preceding QT interval, QT_{n-1}, is estimated as a function of a preceding RR interval, RR_{n-1}.

6. The method of claim **5**, in which QT_{n-1} is estimated as:

$$QT_{n-1} = K \cdot \ln(RR_{n-1}) - C$$

where K and C are defined constants and RR_{n-1} is the measured preceding RR interval.

7. The method of claim **6**, in which K and C are defined as approximately 166.2 and 715.5, respectively.

8. The method of claim **6**, in which K and C are defined as approximately 185.5 and 812.3, respectively.

9. The method of claim **4**, in which the second predetermined value is approximately equal to 60 milliseconds.

10. The method of claim **1**, in which the first predetermined value is approximately equal to 135 milliseconds.

11. A system comprising:

an atrial sensing channel, configured for detecting an atrial heart signal indicating a presence of atrial fibrillation;

a ventricular sensing channel, configured for detecting a ventricular heart signal including ventricular depolarizations indicating ventricular contractions;

a shock generator, for generating an atrial defibrillation shock;

a controller, coupled to the atrial sensing channel for receiving the atrial heart signal, coupled to the ventricular sensing channel for receiving the ventricular heart signal, and coupled to the shock generator for triggering delivery of the atrial defibrillation shock, the controller including:

a ventricular sensing refractory timer, initiating a present refractory period, T_n, upon occurrence of a most recent ventricular depolarization, the refractory period expiring after a first predetermined time value unless extended by the detection of ventricular noise during the refractory period; and

a present RR interval, RR_n, timer initiated by the most recent ventricular depolarization and expiring upon a subsequent sensed or paced ventricular depolarization; and

wherein the triggering delivery of the atrial defibrillation shock occurs upon expiration of the present RR interval timer and requires that the refractory period T_n expires without being extended.

12. The system of claim **11**, in which the triggering delivery of the atrial defibrillation shock also requires that the present RR interval is not both initiated by a paced ventricular depolarization and concluded by a sensed ventricular depolarization.

13. The system of claim **11**, in which the first predetermined time value provides different values if the present RR interval is initiated by a sensed ventricular

depolarization than if the present RR interval is initiated by a paced ventricular depolarization.

14. The system of claim **11**, in which the triggering delivery of the atrial defibrillation shock also requires at least one of:

(A) the present RR interval is longer than a preceding QT interval by a second predetermined value;

(B) the present RR interval duration is longer than the preceding QT interval by the second predetermined value, and the present RR interval duration is longer than a third predetermined value;

(c) the present RR interval duration is longer than a fourth predetermined value, in which the fourth predetermined value is greater than the third predetermined value;

(D) the present RR interval duration is longer than a preceding RR interval by a fifth predetermined value, and the present RR interval duration is longer than a sixth predetermined value; and

(E) the present RR interval duration is longer than a seventh predetermined value, in which the seventh predetermined value is greater than the sixth predetermined value.

15. The system of claim **14**, in which the controller estimates the preceding QT interval, QT_{n-1}, as a function of a preceding RR interval, RR_{n-1}.

16. The system of claim **15**, in which the controller estimates QT_{n-1} as:

$$QT_{n-1} = K \cdot \ln(RR_{n-1}) - C$$

where K and C are defined constants and RR_{n-1} is the measured preceding RR interval.

17. The system of claim **15**, in which K and C are defined as approximately 166.2 and 715.5, respectively.

18. The system of claim **15**, in which K and C are defined as approximately 185.5 and 812.3, respectively.

19. The system of claim **14**, in which the second predetermined value is approximately equal to 60 milliseconds.

20. The system of claim **11**, further including at least one of: (A) an atrial electrode; (B) a ventricular electrode; and (c) a programmer remote from the controller and communicatively coupled thereto.

21. A method including:

detecting an episode of atrial fibrillation in an atrium;

sensing ventricular depolarizations;

measuring a duration of a present RR interval since a most recent ventricular depolarization;

delivering an atrial defibrillation shock synchronized to a ventricular depolarization, which concludes a present RR interval, if the present RR interval is shockable, in which the shockable present RR interval requires that the present RR interval includes at least a minimum time period after the expiration of a ventricular sensing refractory period of the present RR interval and before occurrence of the ventricular depolarization concluding the present RR interval.

22. The method of claim **21**, in which the shockable present RR interval further requires that the present RR interval is initiated by a sensed ventricular depolarization.

23. The method of claim **21**, in which the shockable present RR interval also requires at least one of:

(A) the present RR interval duration is longer than a preceding QT interval duration by a second predetermined value;

(B) the present RR interval duration is longer than the preceding QT interval by the second predetermined value, and the present RR interval duration is longer than a third predetermined value;

(c) the present RR interval duration is longer than a fourth predetermined value, in which the fourth predetermined value is greater than the third predetermined value;

(D) the present RR interval duration is longer than a preceding RR interval by a fifth predetermined value, and the present RR interval duration is longer than a sixth predetermined value; and

(E) the present RR interval duration is longer than a seventh predetermined value, in which the seventh predetermined value is greater than the sixth predetermined value.

24. The method of claim **21**, in which the shockable present RR interval requires that the present RR interval includes a minimum time period of approximately between 265 milliseconds and 565 milliseconds after the expiration of a ventricular sensing refractory period of the present RR interval and before occurrence of the ventricular depolarization concluding the present RR interval.

25. The method of claim **24**, in which the minimum time period is about 365 milliseconds.

26. A system comprising:

an atrial sensing channel, configured for detecting an atrial heart signal indicating the presence of atrial fibrillation;

a ventricular sensing channel, configured for detecting a ventricular heart signal including ventricular depolarizations indicating ventricular contractions;

a shock generator, for generating an atrial defibrillation shock;

a controller, coupled to the atrial sensing channel for receiving the atrial heart signal, coupled to the ventricular sensing channel for receiving the ventricular

heart signal, and coupled to the shock generator for triggering delivery of the atrial defibrillation shock, the controller including:

a ventricular sensing refractory timer, initiating a present refractory period, T_n, upon occurrence of a most recent ventricular depolarization, the refractory period expiring after a first predetermined time value unless extended by: (a) a paced ventricular depolarization initiating the refractory period, or (b) the detection of ventricular noise during the refractory period; and

a present RR interval, RR_n, timer initiated by the most recent ventricular depolarization and expiring upon a subsequent sensed or paced ventricular depolarization; and

wherein the triggering delivery of the atrial defibrillation shock occurs upon expiration of the present RR interval timer and requires that the present RR interval includes at least a minimum time period after expiration of the refractory period T_n and before the subsequent sensed or paced ventricular depolarization triggering expiration of the present RR interval, RR_n.

27. The system of claim **26**, in which the shockable RR interval also requires that the present RR interval is not both initiated by a paced ventricular depolarization and concluded by a sensed ventricular depolarization.

28. The system of claim **26**, in which the triggering delivery of the atrial defibrillation shock also requires at least one of:

(A) the present RR interval is longer than a preceding QT interval by a second predetermined value;

(B) the present RR interval duration is longer than the preceding QT interval by the second predetermined value, and the present RR interval duration is longer than a third predetermined value;

(c) the present RR interval duration is longer than a fourth predetermined value, in which the fourth predetermined value is greater than the third

predetermined value;

(D) the present RR interval duration is longer than a preceding RR interval by a fifth predetermined value, and the present RR interval duration is longer than a sixth predetermined value; and

(E) the present RR interval duration is longer than a seventh predetermined value, in which the seventh predetermined value is greater than the sixth predetermined value.

29. The system of claim **26**, in which triggering delivery of the atrial defibrillation shock also requires that the present RR interval includes at least a minimum time period of approximately between 265 milliseconds and 565 milliseconds after expiration of the refractory period T_n and before the subsequent sensed or paced ventricular depolarization triggering expiration of the present RR interval, RR_n.

30. The system of claim **29**, in which the minimum time periods is about 365 milliseconds.

31. The system of claim **26**, further including at least one of: (A) an atrial electrode; (B) a ventricular electrode; and (c) a programmer remote from the controller and communicatively coupled thereto.